The Origins of Life and Evolution

MBL Lectures in Biology: Volume 1

Edited by H. O. Halvorson and K. E. van Holde
Alan R. Liss; New York, 1980
xiv + 126 pages. $16.00

I will express here my disappointment briefly, since this book has been otherwise reviewed thoroughly in Cell (25, 576–577) and in Trends Biochem. Sci. (6, xiv–xv). The book contains 9 contributions to a conference held at the Marine Biological Laboratories, Woods Hole, spanning a wide spectrum of topics: micropaleontology; geochemistry; prebiotic chemistry; molecular evolution. Most papers are pertinent and concise, and may provide enjoyable reading material for your travels, but they are too thin to serve educational purposes. Some papers are essays or primary articles, others look like reviews or laboratory reports. Thus the book suffers from excessive heterogeneity and can be exchanged, without disadvantage, for a collection of 9 reprints of good articles covering the same topics.

Jacques Ninio

Biological Energy Conservation: Oxidative Phosphorylation (Second Edition)

Outline Studies in Biology

by C. W. Jones
Chapman and Hall; London, New York, 1981
78 pages. £2.45

The first publication of this book in 1976 as part of the Outline Studies in Biology series was widely acknowledged to have succeeded in its aim of providing a concise and contemporary account of energy conservation in both mitochondria and bacteria. In this context the book was particularly useful to final year biochemistry undergraduates and also to researchers in related areas who wished to bring themselves up to date with current developments, but who did not want to proceed directly to specialist reviews.

The last 5 years however have seen a considerable expansion in research in bioenergetics and a more sophisticated perception of several underlying concepts, most notably perhaps in the mechanism of oxidative phosphorylation. These recent advances are reflected in this new second edition where a notably more integrated approach is provided.

The book is now divided into 5 instead of 6 chapters, these being: An introduction to bioenergetics; The components of the respiratory chain; The organisation and function of the coupling membrane; Energy coupling; and Mechanisms of oxidative phosphorylation. The chapters are further subdivided to provide a framework around which each subject area may be discussed; for example, the chapter on energy coupling contains the following subsections: Energy coupling sites; Respiratory control; Crossover points; Uncoupling agents; Phosphorylation inhibitors; Reversed electron transfer; and The energized state. In a few instances these subsections are further divided.

It is however in the final chapter on the mechanisms of oxidative phosphorylation where the most notable changes from the first edition have been made. This has allowed an extended discussion of the chemi-

osmotic hypothesis, especially in relation to the ion-impermeable coupling membrane and the proton-translocating ATP phosphohydrolase. Consideration is also given to the localized proton hypothesis which was absent from the first edition. The majority of the subsections in this chapter are complemented by relevant diagrams which are a prerequisite for a clear exposition of some of the rather complex concepts which are outlined.

My overall impression is that in a series of this nature, the rapid advance of knowledge in specific areas highlights the necessity of constantly up-dating the published information. The second edition of this text fulfils such a requirement and without doubt will be both read and welcomed by a large number of people.

R. F. G. Booth

The Biochemistry of Plants: A Comprehensive Treatise – Vol. 6: Proteins and Nucleic Acids

Editors-in-Chief: P. K. Stumpf and E. E. Conn

Vol. 6 edited by A. Marcus
Academic Press; London, New York, Toronto, 1981
xiv + 658 pages. $67.50

Since 1960 when J. Bonner wrote 'There is much work to be done in plant biochemistry' there has been an explosive expansion of knowledge in biochemistry as a whole. However, until recently study of plants has had a mixed reception. Plants, it was argued, had features that made them difficult experimental organisms. Recent developments in molecular biology and biotechnology could well counter this prejudice and permit a focus on important agricultural problems. As the Editors of this very timely treatise point out, the most prevalent disease in the world is starvation.

Volume 6 of this 8-volume series covers plant proteins and nucleic acids. Unfortunately it gets off to a slightly damp start as the first chapter on the structure and function of the nuclear genome (Thompson and Murray) is acknowledged to be two years out of date. Nevertheless it contains a goodly proportion of useful basic data on overall sequence organisation in a wide variety of plants, as well as information on chromatin components. This is followed by a fairly general chapter by Flashman and Levings on how nucleases can be applied to sequence analysis, gene isolation and cloning of particular genes. Dyer and Jones then contribute an excellent chapter on plant RNAs and the complex area of nucleotide biosynthesis is competently covered by Ross.

A state-of-the-art survey of plant DNA and RNA polymerases by Guilfoyle follows, and the recent advances in our understanding of plant organelle genome organisation are highlighted by Edelman. Steinback then lucidly documents the intricacies of chloroplast protein biosynthesis with the interplay of nuclear and chloroplast chromosomes, as well as the transport and post-translational modifications involved. An odd omission from this volume is a survey of the situation with regard to plant mitochondrial protein synthesis. There is however a chapter on general protein synthesis by Weeks. This is not particularly orientated to the plant scene, rather it deals with the overall mechanistic aspects.

Interest in proteolysis reflects interest in processes important to agriculture and plant physiology. Most of our knowledge comes from animal and microbial enzyme studies, but the stimulating chapter by Ryan and Walker-Simmons details the plant situation. Ryan follows this with a survey of protease inhibitors. Here interest has expanded from effects on human food chain to possible roles in plant metabolism and natural protective systems.

A chapter on lectins by Lis and Sharon will be an extremely useful reference source for lectin users, as well as providing information on possible natural rôles. Larkins deals with seed storage proteins which are of obvious nutritional economic importance.